A Study of Users Expectations for Metadata Repositories of Educational Resources

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Abstract. This paper presents the role of contemporary digital libraries with educational resources in Europe. The importance of enriching digital resources with complete, descriptive and accurate metadata is discussed as well as how these metadata are supported within an European project – Share.TEC. The paper presents the results of a workshop with members of the project target group. The participants were asked to complete a questionnaire and provide feedback about specific issues related to the metadata of digital resources for teacher education community. The results of the workshop are discussed and analysed. They were used for future improvements of the Share.TEC system.

Keywords: digital repositories, metadata, ontology, knowledge sharing, educational resources, digital libraries

1 Introduction

The current Web 2.0 phenomenon is stressing on sharing digital educational resources and discussing the best way of their use. This poses serious challenges to teachers' trainers – to apply the style, which will be most flexible and feasible for teachers, and to prepare them to be ready to teach and learn in the current digital society.

In order to explore in the best possible way the knowledge and resource sharing approach, current teachers need to know how to solve several general problems: available resources are scattered and not structured well, which makes them difficult to find. There is significant lack of sufficient meta-information, which can help in the process of searching for the right information at the right time and at the right place.

Teacher education in principle is slow to embrace innovations such as these offered by Web 2.0 tools. National educational systems are culturally bound; Teacher Education (TE) communities have local locus and sharing of digital resources at international level is scarce and still in embryonic form.

Thanks to IT some of the traditional characteristics of the education underwent some modifications. The modern educational model includes:

- Pedagogical characteristics and classification of the TE resources, more often in the form of ontologies, like TEO – Teacher Education Ontology
- Education oriented to the individual needs and to specific competences
- Abilities to understand different languages and different cultures
- Abilities to search for, analyse and reuse information in digital form

The project Share.TEC: Sharing Digital Resources in the Teaching Education Community [1] is aiming to help teachers and teacher educators to achieve these general goals by solving several specific tasks: building an advanced user-focused system; aggregating Europe-wide metadata; providing personalized, culturally-sensitive brokerage; supporting the development of perspective among those working in and with the TE community; powerful and flexible recommender system taking into account the user needs and personal preferences; convenient and community-oriented Web 2.0 features like commenting, ranking, rating, community building.

2 Share.TEC model and ontology

In order to complete its tasks, Share.TEC project uses digital metadata repositories as a foundation of its solution. This section clarifies our understanding of this concept.

Digital libraries, metadata and metadata repositories

Digital libraries are organized collections of digital content made available to the public by cultural and scientific institutions (libraries, archives and museums) and publishers. They can consist of all kinds of "physical" material that has been digitalized (books, audiovisual or multimedia material, photographs, documents in archives, etc.) and material originally produced in digital format. Knowledge sharing is the main function of digital libraries. It can be achieved through:

- Creation and management of digital collections
- Providing free access to leading world scientific achievements
- Sharing of digital learning resources
- Increasing the visibility and widening the influence
- Displaying the best results and products available

Metadata are the key for providing the needed meaning to the original resources, making them more transparent, easy to find and use. They are an additional data, which describe details about the original data. These details may include different characteristics, features, links and properties of the original data. In the past metadata were used mainly to catalogue the books in the traditional libraries. Now metadata are the key for searching, finding and using the right data.

By using metadata we move from digital libraries to specialized massive metadata repositories combined with additional semantic information (most commonly in the form of ontologies and taxonomies) - *digital metadata repositories*, which try to categorize and link all possible information resources in a given domain.

Common metadata model and Teacher education ontology

Keeping in mind available technologies, the Share.TEC partners set as main goal of Share.TEC system [2] to establish a highly visible and functional portal with advanced brokerage services that will provide personalised access to a

wide-range of Teacher Education content. The heart of the Share.TEC system is the central repository [3], storing metadata about TE resources. All metadata stored in the repository follow the *Common Metadata Model* (CMM) metadata format ([4], [5]), which is based on the Learning Object Metadata (LOM) format [6]. The main extension concerns pedagogical characterization of digital content.

In the frame of Share.TEC project a specific ontology, called TEO (*Teacher Education Ontology*) ([5], [7], [8]) was developed. The goal was to provide more robust, flexible and powerful way for classifying TE resources in the central Share.TEC repository.

TEO [9] addresses the world of Teacher Education (TE) and especially TE digital resources and practices across Europe. The ontology has a multi-layered structure, with a common top level that can be instantiated at lower levels into concrete, language-specific ontologies. These gain specificity by being contextualized in particular national settings.

TEO purposes are:

- Pedagogical characterization of digital content
- Representation of user profiles and competencies
- Multilingual and multicultural foundation
- Personalized interaction with adaptive applications
- Support for recommending functions

TEO seeks to capture the areas considered crucial for describing, exchanging, sharing, and developing resources devoted specifically to TE. Its complex structure is organised in a set of ontology branches, which are dedicated to:

- Digital content (educational resources and artifacts closely related to the concept of "learning object")
- Competencies (both at subject-matter level and transversally - socio-affective, meta-cognitive, etc.)
- Knowledge domain
- Context (various contexts of action within the domain of Teacher Education)
- Actor (persons in the TE context and in the Share.TEC system)

3 Teachers expectations and requirements analysis

In the beginning of February 2010 a workshop was held at Sofia University. It was a part of a series of European workshops dedicated to the research on users' expectations about metadata repository functionalities.

As the Share.TEC system is designed to serve especially teacher education, there were invited (as voluntaries) teachers' educators and teachers in different areas. Nine teachers and eight teachers' educators (university professors engaged in pre- and in-service teachers training) accepted the invitation and were involved in the workshop.

The paper presents this particular workshop context and results. As the results from other European workshops are not elaborated till the moment, the article reflects especially Bulgarian users' expectations and requirements.

The workshop had two main goals:

- To identify expectations of the users for main functionalities of the Share. TEC portal
- To test the teachers' education ontology (TEO) and common meta-data model (CMM) with practitioners in the field

The workshop started with filling in a questionnaire through which we would like to evaluate what are the expectations of potential users in respect to digital repositories with metadata for teacher education resources.

The questionnaire contained three main groups of questions. The first group was on teachers and their trainers searching habits and behaviour. The role of the social networks and community of practices in the teachers' continues development were in the focus of second part. The last part was dedicated on criteria for determining appropriateness and quality of teacher training internet resources. In the paper we discuss answers of key questions from each of these groups.

Keeping in mind that there are a lot of web instruments for searching internet resources, it was interesting which of them are the most popular and whether there is a need for new tools. The participants' responses on the question *What type of Web tools do you use when searching in Internet?* are various (Figure 1).

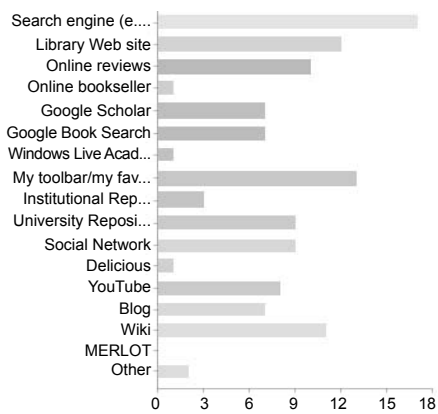

Fig. 1. Types of searching engines used.

As we expected, most of the workshop participants usually use well-known searching engines.

Asked *What types of barriers, if any, have you found while searching for digital materials?* teachers and trainers shared:

- *Most of the digital resources are without description and I should open the resource in order to decide is it useful for me.*
- *The found information is not classified.*
- *In many cases you should read/view the whole material to understand is it applicable in your teaching case.*

Problems discussed by participants confirm our initial belief, that there is a need of classification, based on an appropriate ontology, of the resources in dig-

ital repositories. These resources should be also described through additional data - metadata.

Our accumulated impressions and experience gained during the work with teachers and their trainers gave us the ground to state the hypothesis that teachers and trainers internet communities of practice have important role in their long life self education. In order to prove or reject that hypothesis we pose the second group of questions related to the use of social networks and communities of practice.

Eleven of the respondents answered "yes" to the question *Do you use Facebook or any other social network (LinkedIn, Plaxo, Xing)?* Six persons answered with "no".

The participants who answered positively were asked: *Which is the feature that you prefer in your social network? Why?* The majority of the answers were:

- *They connect me with people with common interests.*
- *They help me to communicate with people all over the world and to discuss similar problems in my professional area.*
- *Sharing the amazing and useful content, communication.*

It is interesting to notice that although social networks are considered mainly for communication, our workshop participants accept them also as a tool for sharing content and professional experience.

On next question *Do you know what a "Community of Practice" is?* we received 12 positive and 5 negative answers.

The positive answers of the question *Have you ever been a member of a "Community of Practice"?* were 8, negative – 9. Approximately the same was distribution of answers of the question *Are you a member of a community of teachers at national or international level?* – 9 positive, 8 negative.

After completing the questionnaire we are surprised that some of the participants asked about the meaning of the term *Community of Practice*. When we clarified it, the same teachers told us that they had marked the negative answer on the question, but actually they had participated in such communities.

The people who indicated positive answers of the previous two questions were asked the question *Why are you a member of a professional community?* The main pointed reasons were:

- *To share my experience and to learn from colleagues' experience*
- *To find and share educational resources*
- *To share and exchange experience and resources*

Their responses mean that teachers are lead by the willingness to exchange experience and resources in professional communities.

On the question *Would you like to work online with colleagues for problem solving you are interested in?* most of the participants (all except one) marked the positive answer.

Most, but not all of the participants would like to receive information from the community or automatic services if we take into account the 13 positive and 4 negative answers of the question *Would you like to receive proposals or automatic services from the community?*

Only 12% of people do not like to participate in a professional community, based on sharing of resources and comments. The other 88% prefer such network and add:

- *For me as a teacher it is very important to read comments about some resources and to have a vision about their quality and possible application.*
- *It is time- and effort-consuming, or just impossible to develop /create own materials The colleagues' opinion is very important for me.*

The last part of the questionnaire was focused on the criteria for selection of educational materials. The workshop participants answered on its first question *What kind of resource information will convince you to use it?* as it is shown on Figure 2. For them the most important are resource annotation and area of knowledge. The type of resource, author and its rating are also significant.

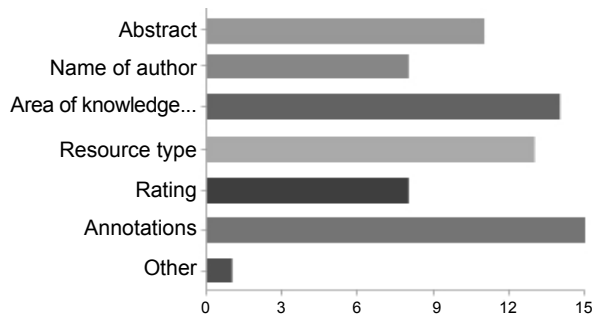

Fig. 2. Level of significance of resource selection.

We received similar results (Figure 3) for the question *What kind of information contribute for understanding of resource quality?* In this case users think the most important is resource annotation as well as community rating and resource author.

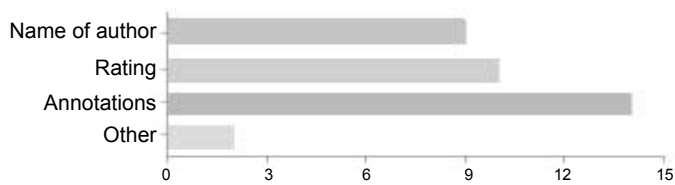

Fig. 3. Level of significance of resource assessment.

The answers (Table 1) of the question *Would you like to see the choices made on the resources from your colleagues? What in particular?* show that people are influenced from the others' actions and choices. The users would prefer to see the selection of people with similar interests.

Table 1

What do they see	29%	What do they buy?	35%
What do they download	76%	Other	12%

The analyses proof the hypothesis that teachers would like to share experience and resources and for them is very important the colleagues' opinion for selection of learning materials.

4 TEO and CMM in action

The second part of the workshop aimed to determine to what extend Share.TEC common metadata model (CMM) and teacher education ontology (TEO) correspond to users understanding and requirements.

As it was identified through the answers of the questionnaire, the teachers and their educators focused on resources' metadata from pedagogical point of view – pedagogical goals, educational level (e.g. age), knowledge area (e.g. discipline, subject), type of application (e.g. individually, in groups), etc. However, these metadata are not available for the LOM resources. They should be created for resources using CMM by experts in the field of education.

In order to develop CMM metadata for TE resources we provided workshop participants with specially created Share.TEC tool – Resource Integration Companion Kit (RICK). The RICK tool gives support to individual users for creating resource records according to CMM. It is an interactive user driven tool.

The second stage of the workshop was organized as a hands-on experiment. The assignment for the participants was to choose the teacher's education material and to create metadata for it via RICK. The goal was to identify to what extent CMM as a model for classification of resources is natural, understandable and easy to use. The key point in participants' work was classifying and describing the pedagogical characteristics of the resource (Figure 4) in terms of TEO.

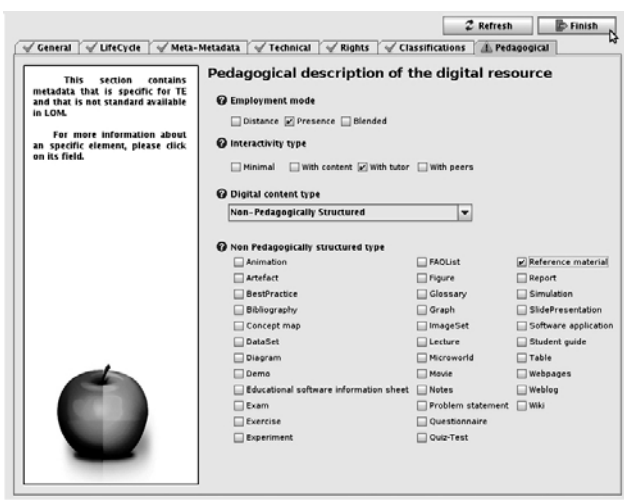

Fig. 4. Pedagogical metadata of the resources.

The observations and participants' feedback during the workshop gave us the impression that Share.TEC model is convenient to create CMM metadata of the TE resources. We believe this is a prerequisite in order the teachers' educators to use it. On this base we hope that they will share actively described TE resources and experiences in the communities of practice.

Despite the participants are experts in teachers' education, most of them expressed the opinion that some of the used terms are new to them and gave us recommendations to develop guide in order to support in process of metadata creation.

5 Conclusions

Analyzing the workshop result, we can conclude that the teacher education ontology and common metadata model developed in the frame of the Share.TEC project provide appropriate environment for classification of digital and printed resources for teachers' education and self development. *We are happy that finally we have a possibility to collect and easily find the needed materials!*, shared one of the participants in the workshop. Trainees' feedback shows that the TEO and CMM can meet users' requirements and that they are appropriate basis for future development of the Share.TEC portal.

Some participants reported technical bugs of RICK tool. Their descriptions were provided to the developers and most of them are already fixed and improved version of the tool is available.

Based on the notes collected during the observation, the process of CMM handbook development was started. Share.TEC partners discussed and identified the handbook structure. The full text writing and localization are coming soon.

Our future plans include providing the possibility for users to extend the TEO according their needs and experience.

The requirements collected through questionnaire are analyzed. The main functionalities of Share.TEC portal were identified and according to them the user interface and prototype systems development started.

We hope that the developed models will be applicable and useful not only in the frame of the Share.TEC project, but also in other products, related to the teacher education.

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